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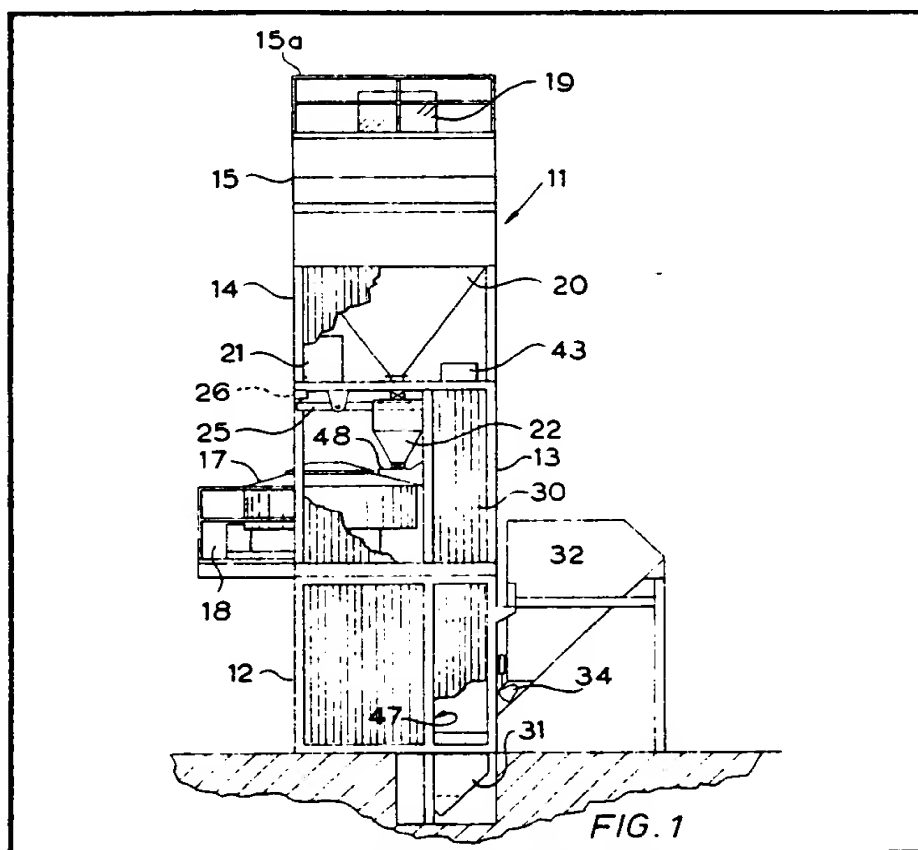
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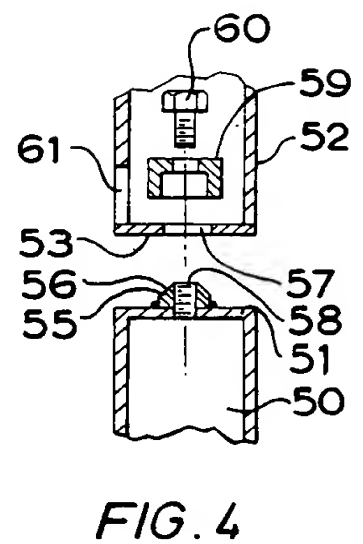
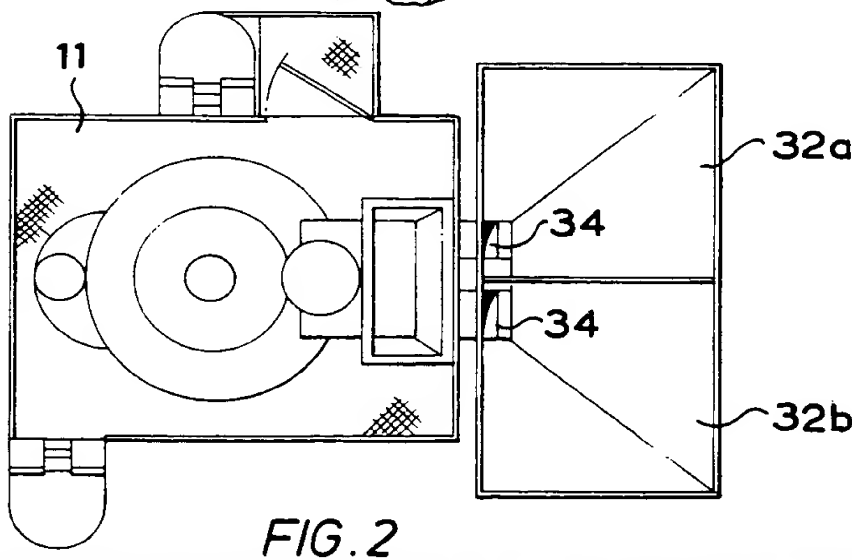
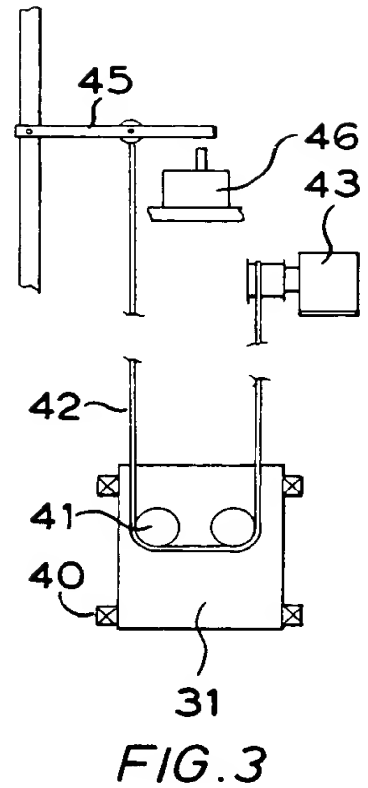
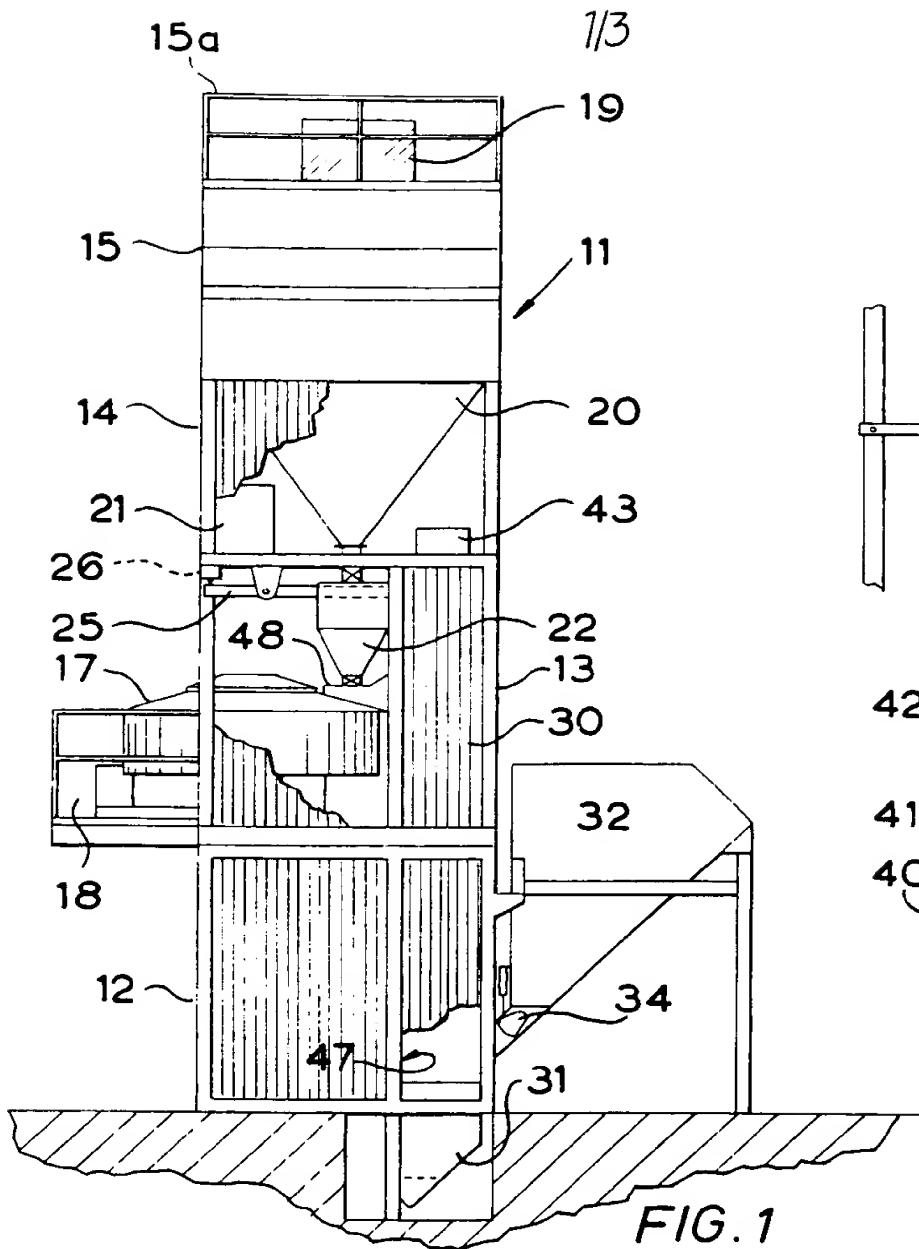
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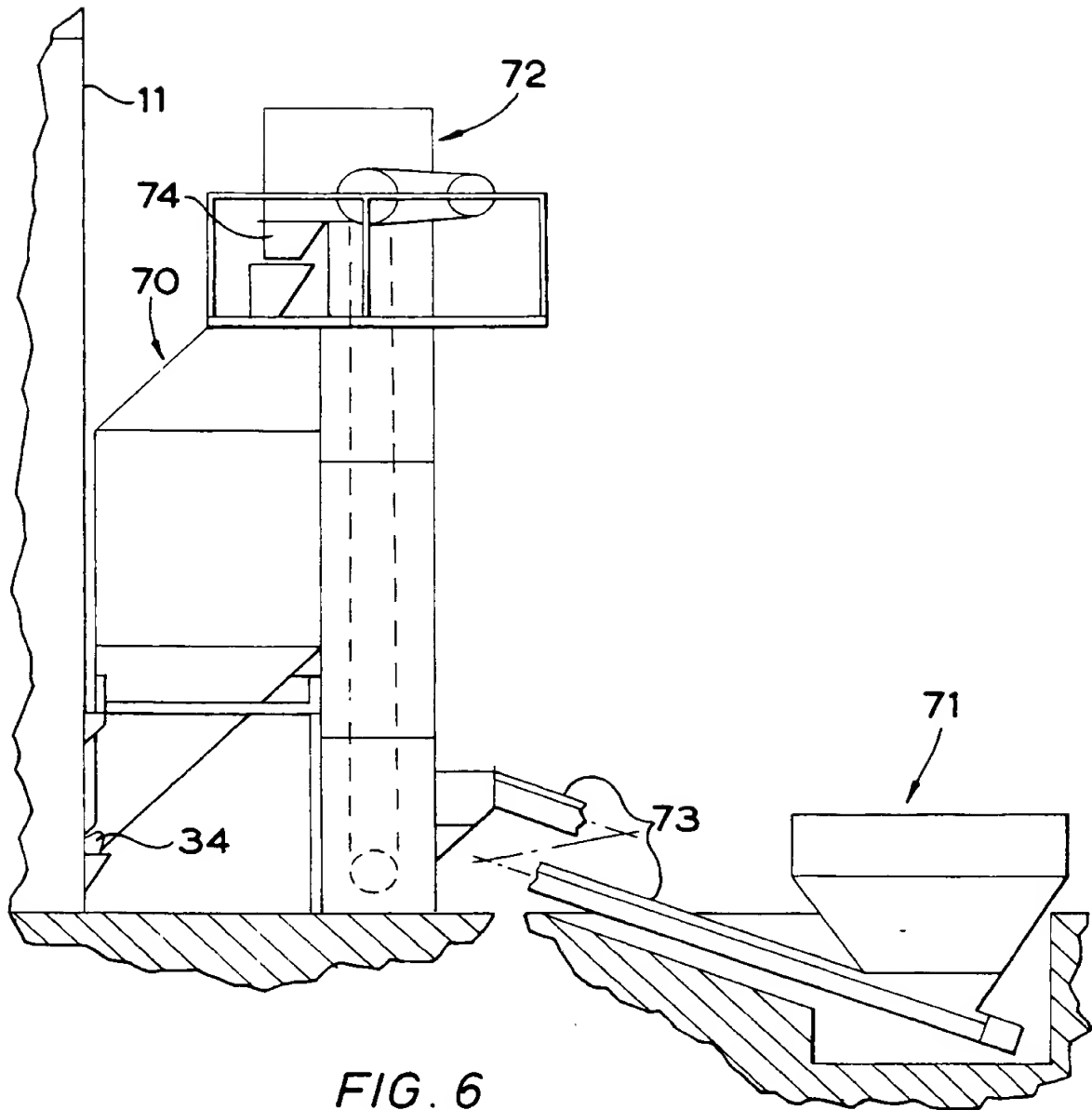
(54) Cement mixing tower

(57) The tower comprises a plurality of modules 12—15 secured one on another with an upper module 14 being provided with cement 20 and water 21 supply means, an intermediate module 13 being provided with a laterally displaced

mixing device 17 for receiving the cement and water, and a lower module 12 for receiving ballast and having a guide shaft 30 with a hoist and skip 31 for raising the ballast to the mixing device 17. The skip is fed from a ballast container 32 in turn fed by a vertical bucket conveyor from a supply hopper.







SPECIFICATION

Cement mixing apparatus

This invention relates to cement mixing apparatus.

- 5 Cement mixing is commonly carried out automatically in a tower arrangement. Such arrangements occupy a large ground area and erection takes a considerable time.

- 10 According to one aspect of the present invention there is provided cement mixing apparatus comprising a plurality of modules secured one on another in a tower arrangement with an upper module being provided with cement and water supply means, an intermediate
15 module being provided with a mixing device for receiving cement and water from said supply means, and a lower module for receiving ballast and having means for raising the ballast to the mixing device.

- 20 Each module preferably comprises a frame having interconnected corner uprights adapted for secureance to uprights of an upper and/or lower module, and cladding on the frame of each module.

- 25 Preferably the apparatus is provided with a roof which is attached to the uppermost module.

- Desirably the roof is detachable to permit addition of further modules to the uppermost module, thereby increasing the storage capacity
30 of the apparatus.

This modular construction facilitates easy transport and erection.

- According to another aspect of the present invention there is provided cement mixing
35 apparatus comprising a housing incorporating a mixing device at a raised elevation, water supply means and cement supply means within the tower above the mixing device, guide means extending within the tower from a lower station
40 up to the mixing device, a ballast container movable in the guide means, and means for raising and lowering the container for feeding ballast to the mixing device.

- Preferably, the means for raising and lowering
45 the container incorporates weighing means having a load cell for weighing the container and its contents.

- This arrangement is compact, occupying a much smaller ground area than is usual, and permits
50 direct weighing during supply of ballast to the mixing device.

Reference is now made to the accompanying drawings wherein:—

- Figure 1 is a diagrammatic section side
55 elevation of apparatus according to the invention; Figure 2 is a plan view of the apparatus;

Figure 3 is a diagrammatic view showing how a ballast skip of the apparatus is raised and weighed;

- 60 Figure 4 is a diagrammatic view showing how modules of the apparatus are secured together;

Figure 5 is a diagrammatic section side elevation of an embodiment of the apparatus incorporating an aggregates bunker; and

- 65 Figure 6 is a diagrammatic section side elevation of a device to fill an aggregates bunker.

- Referring to Figures 1 and 2, the apparatus shown comprises a tower 11, which is constructed from first, second, third or fourth
70 modules 12 to 15 arranged one on another. The second module 13, which is held above ground level by the first module 12, houses a cement mixing device 17, which may be of conventional design. The mixing device 17 is offset from a central
75 position and has an outlet portion 18 projecting laterally outside the tower for supplying a concrete mix to a vehicle container. Cement is blown to the top of the tower and fed through a filter 19 to a storage container 20 in the third
80 module 14. Water is fed to a water reservoir 21 also in this module. When required, water is supplied to the mixing device 17 from the reservoir 21, and cement is supplied to a weigh hopper 22 from the storage container 20 and
85 from there to the mixing device 17. Control is by means of remotely operated valves in conventional manner. Ballast is raised to the mixing device in a manner described hereafter.

- The upper module 15 is provided with a roof
90 15a which is removable to permit the addition of further modules (not shown). These modules can be used for storing further materials.

- The weigh hopper 22 is supported on an arm of a lever 25, which bears on a load cell 26 for
95 controlling the amount of cement to be supplied to the mixing device 17.

- A shaft 30 is provided extending through the first and second modules 12, 13 to a position below ground level. The shaft has vertical guides
100 (not shown) which guide a skip 31. The skip is movable from a position at the bottom of the shaft, where ballast can be gravitationally fed to the skip from a feed hopper 32 adjacent the first module, to a position adjacent the mixing device
105 17 for depositing ballast therein. As is apparent from Figure 2, the feed hopper may have two (or more) sections 32a, 32b for coarse and fine ballast respectively. The quantity of ballast fed into the skip is controlled by pneumatically
110 operated valves 34 according to the weight of material in the skip.

- As shown in Figure 3, the skip 31 has runners
40 for engaging the guides in the shaft 30. The skip 31 carries pulley wheels 41 by which it is
115 suspended from a rope 42. The rope is connected at one end to a winch 43 mounted at the top of the shaft 30. The other end of the rope 42 is secured to a lever 45, which actuates a load cell 46 which serves to weigh the material in the skip
120 31.

- The skip 31 may have an outlet opening closed by a hinged door (not shown), the door being held closed by contact with a wall 47 of the shaft 30. An opening in the wall 47 opens into a chute 48
125 above the mixing device 17. The door is biased open and opens into the chute when the skip is in the raised position to deposit ballast in the mixing device 17.

Electric drive apparatus, a pneumatic compressor and controls for these, for weighing and for initiating actuation of the various valves may be housed in the first module 12.

- 5 At least the first and second modules each has four corner uprights of hollow section, connected together and clad. As shown in Figure 4, an upright 50 of the first module 12 has the top of its hollow section closed by a plate 51. The bottom of an upright 52 of the second module 13 is similarly closed by a plate 53. A boss 55 projects upwardly from the plate 51 and has a chamfered leading end 56 for facilitating engagement in an aperture 57 in the other plate 53. The boss has an internal threaded bore 58. A cap 59 fits over the boss 55 with the upright 52 of the second module, and a bolt 60 has its shank passing through the cap and screw-engaging with the boss 55 to consolidate these parts and hold the uprights firmly together. An opening 61 in a wall of the upper upright 52 permits access to the bolt.

- 10 Figure 5 shows an aggregates bunker 70 arranged adjacent to the tower 11. The aggregates or ballast can be fed gravitationally to skip 31 through valves 34.

- 25 In Figure 6 a device is attached for filling an aggregates bunker 70. The aggregates or ballast may be deposited by conventional means into a hopper 71. The hopper 71 may be provided with flange plates on 3 sides in order to eliminate spillage.

- 30 The aggregates can be transferred from hopper 71 to a bucket elevator 72 by means of conveyor 73. The conveyor may be provided with a cover (not shown). The bucket elevator raises the aggregates from the chute 73 to a chute 74 by conventional means. The bucket elevator transfers the aggregates from the conveyor and deposits them in the aggregates bunker 70 through the chute 74.

Claims

1. Cement mixing apparatus comprising a plurality of modules secured one on another in a tower arrangement with an upper module being provided with cement and water supply means, an intermediate module being provided with a mixing device for receiving cement and water

- 50 from said supply means, and a lower module for receiving ballast and having means for raising the ballast to the mixing device.

2. Cement mixing apparatus according to Claim 1, in which each module comprises a frame having interconnected corner uprights adapted for secureance to uprights of the module disposed immediately above and/or below.

- 55 3. Cement mixing apparatus according to Claim 2, in which cladding is provided on the frame of each module.

- 60 4. Cement mixing apparatus according to Claim 1, 2 or 3 having a roof which is attached to the uppermost module.

- 65 5. Cement mixing apparatus according to Claim 4, in which the roof is detachable to permit the addition of further modules to the uppermost module.

6. Cement mixing apparatus according to any preceding claim, in which the mixing device is disposed at a location which is offset from the centre of the intermediate module.

- 70 7. Cement mixing apparatus according to any preceding claim, in which the lower module and the intermediate module are provided with a shaft within which a skip can be raised and lowered, said skip being adapted to carry aggregates.

- 75 8. Cement mixing apparatus according to any preceding claim having an aggregates bunker disposed adjacent the tower arrangement for supplying aggregates to the lower module.

- 80 9. Cement mixing apparatus comprising a housing incorporating a mixing device at a raise level elevation water supply means and cement supply means within the tower above the mixing device, guide means extending within the tower from a lower station to the mixing device, a ballast container movable in the guide means, and means for raising and lowering the container for feeding ballast to the mixing device.

10. Cement mixing apparatus according to Claim 9, in which the means for raising and lowering the container comprises weighing means having a load cell for weighing the container and its contents.

- 95 11. Cement mixing apparatus substantially as herein described with reference to and as shown in the accompanying drawings.